

68709

S/069/60/022/01/021/025  
D034/D003

~~5~~ 5.3830(A)  
5.1220

AUTHORS: Yurzhenko, A.I., Ivanchov, S.S.

TITLE: The Effect of Fatty Acid Salts on the Process of Styrene Polymerization in Emulsions

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol XXII, Nr 1, pp 120-127 (USSR)

ABSTRACT: The authors report on a study of the effect of sodium salts of fatty acids (from sodium formate to sodium palmitate) on the polymerization kinetics of styrene in an emulsion. This selection permitted study of the effect of the hydrocarbon radical of the anions of the added salts on the polymerization process and evaluation of their growing surface activity, which is of practical value. The technical emulsifiers of the type of fatty acid salts as used in the synthetic rubber industry often represent a mixture of salts of various

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higher and lower acids. For their investigation the authors purified the styrene specimens from inhibitors by processing them with a 20% alkali solution and subjecting them to a subsequent threefold vacuum distillation. Nekal served as emulsifier, and potassium persulfate as initiator of the polymerization. The sodium salts of different acids (propionic, lauric, etc.) were obtained by neutralization with sodium ethylate according to the method of W. Harkins [Ref. 8]. Polymerization was carried out in a dilatometer with magnetic mixer, as shown in Figure 1 (diagram). In contrast to the dilatometer proposed by V.A. Puchin and T.I. Yurzhenko [Ref. 9], the capillary of this device had a free exit for gases which in an inconsiderable amount could form during disintegration of the

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initiator ( $K_2S_2O_8$ ) in the polymerization process. The investigation has established that, according to their effect (regularly changing with growing length of the hydrocarbon radical) on the process of styrene polymerization in an emulsion, the fatty acid salts fall into two groups: group 1 - salts of acids higher than caprylic, continuously increasing the speed of the process when introduced into the reaction mixture; group 2 - salts of acids below caprylic, weakening the polymerization process. An analogous effect of the investigated salts on the rate of initiation of the process and the molecular weight of the forming polymers could be observed: the salts of group 1 increase, and the salts of group 2, after some initial increasing, slow down

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the rate of initiation and diminish the molecular weight of the polymers. The indicated facts are connected with a change in the reaction zone, called forth by the adding of the salts. The zone enlarges on introduction of salts of the group 1, it narrows on introduction of salts of the group 2. Such an assumption agrees with the data concerning the change of the colloidal state of the emulsifier and the dispersity of obtained synthetic latexes, which take place in the presence of the investigated salts. There are 1 diagram, 7 graphs and 11 references, 7 of which are Soviet and 4 English.

ASSOCIATION: L'vovskiy universitet im. Ivana Franko, Kafedra fizicheskoy i kolloidnoy khimii (L'vov University imeni Ivan Franko, Chair of Physical and Colloidal Chemistry)

SUBMITTED: July 5, 1958

Card 4/4

YURZHENKO, A.I.; STOROZH, G.F.

Effect of primary aliphatic alcohols on the sol - coagel  
transition temperature of aqueous sodium stearate solutions.  
Koll.shur. 22 no.3:376-381 Ky-Je '60. (MIRA 13:7)

1. L'vovskiy gosudarstvennyy universitet im. I.Franko, Kafedra  
fizicheskoy i kolloidnoy khimii.  
(Alcohols) (Colloids) (Stearic acid)

82293  
S/079/60/030/007/002/020  
B001/B063

5.3830A

AUTHORS:

Sukmanskaya, I. V., Yurzhenko, A. I.

TITLE:

Investigation of the Thermal Stability and Activity as  
Initiators in the Polymerization of the Diacylperoxides  
of the Cinnamic and Hydrocinnamic Acids

PERIODICAL:

Zhurnal obshchey khimii, 1960, Vol. 30, No. 7,  
pp. 2108-2112

TEXT: It was the purpose of the present paper to compare the thermal stability and the initiating activity of the diacylperoxides of the benzoyl of the cinnamic and hydrocinnamic acids with one another. The authors intended in particular to explain the effect of the groups  $-\text{CH}=\text{CH}-$  and  $-\text{CH}_2-\text{CH}_2-$ , which were introduced between the group  $-\text{O}-\text{O}-$  and the phenyl radical, upon the above-mentioned properties of the diacyl peroxides. The kinetics of the thermal decomposition of these peroxides in chloroform at 70 and 80° shows (Table 1) that the introduction of the groups  $-\text{CH}=\text{CH}-$  and  $-\text{CH}_2-\text{CH}_2-$  between the phenyl radical and the peroxide group lowers the

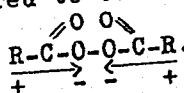
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82293

S/079/60/030/007/002/020  
B001/B063

Investigation of the Thermal Stability and  
Activity as Initiators in the Polymerization  
of the Diacylperoxides of the Cinnamic and Hydrocinnamic Acids

stability of the peroxide and speeds up its decomposition. The activation energy of the process decreases in the following order: benzoyl peroxide > cinnamic acid peroxide > hydrocinnamic acid peroxide. This indicates that the -O-O- bond is weakened in the same order. The authors of the present paper believe that this weakening is due to the weakening of the induction effect caused by the phenyl group. The diacyl peroxide is to be considered to consist of two dipoles which are interlinked and repel each other:



Due to this fact, the -O-O- bond is weakened the more, the more the excess negative charge is localized at the oxygen atoms of the peroxide group. As a result of the electrophilic character of the phenyl group, this charge is lower in the case of benzoyl peroxide and thus increases its stability. The introduction of the group -CH=CH- and especially the group -CH<sub>2</sub>-CH<sub>2</sub>- reduces the effect of the phenyl and thus weakens the -O-O- bond. Consequently, the stability of the peroxides is also reduced. A comparative study of the initiating activity of the

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Investigation of the Thermal Stability and  
Activity as Initiators in the Polymerization  
of the Diacylperoxides of the Cinnamic and Hydrocinnamic Acids

S/079/60/030/007/002/020  
B001/B063

peroxides examined was carried out by the polymerization of styrene, which was initiated by means of the above-mentioned diacyl peroxides. It was found that under equal conditions, the rate of polymerization of styrene increases from benzoyl peroxide to hydrocinnamic acid peroxide (Table 2) just as is the case with the thermal stability. It may be seen from Table 3 that hydrocinnamic acid peroxide shows the most rapid reaction course on initiation, which fact is important to the synthesis of polymerized plastics. There are 3 figures, 3 tables, and 12 references: 5 Soviet, 1 German, and 2 US. X

ASSOCIATION: L'vovskiy meditsinskiy institut (L'vov Medical Institute)

SUBMITTED: July 3, 1959

Card 3/3

S/079/60/030/009/001/015  
B001/B064

5-3300

2209

AUTHORS:

Kucher, R. V., Yurzhenko, A. I.

TITLE:

Oxidation of Butyl Benzenes and Ethyl Benzene in the Liquid Phase in the Presence of Alkali Lyes, Cobalt Stearate, and Auramine

PERIODICAL:

Zhurnal obshchey khimii, 1960, Vol. 30, No. 9, pp. 2798-2804

TEXT: The present paper deals with the effect of caustic soda upon the rate of accumulation of hydroperoxides formed during the oxidation of a mixture of secondary and isobutyl benzenes, as well as of ethyl benzene in the liquid phase. It was shown that for butyl benzenes an amount of 0.1-0.2% sodium hydroxide has the highest efficiency; as for ethyl benzene, the optimum amount of NaOH is approximately 50%. Addition of cobalt stearate results in a higher rate of oxidation of the above hydrocarbons, with the highest possible concentration of the hydroperoxides, however, being reduced; this is mainly due to intensified decomposition of the hydroperoxides in the presence of cobalt stearate. The oxidation of ethyl

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Oxidation of Butyl Benzenes and Ethyl Benzene S/079/60/030/009/001/015  
in the Liquid Phase in the Presence of Alkali BO01/BO64  
Lyes, Cobalt Stearate, and Auramine

benzene and butyl benzenes is accelerated by a slight addition of auramine, the highest possible concentration of hydroperoxides thus being reduced. The authors thank L. A. Baranovskiy for his assistance in experimenting, and mention papers by K. I. Ivanov (Ref. 3) and N. M. Emanuel' (Refs. 6-8). There are 6 figures, 1 table, and 16 references: 13 Soviet, 1 German, and 2 US.

ASSOCIATION: L'vovskiy gosudarstvennyy universitet  
(L'vov State University)

SUBMITTED: May 11, 1959

Card 2/2

S/069/61/023/006/003/005  
B119/B101

AUTHORS: Ivanchov, S. S., Yurzhenko, A. I.

TITLE: Effect of salts of low aliphatic acids on the dispersion of the emulsifier solution and synthetic latexes prepared on their basis

PERIODICAL: Kolloidnyy zhurnal, v. 23, no. 6, 1961, 706 - 711

TEXT: 1% Nekal solution (sodium dibutyl naphthalene sulfonate) was mixed with sodium salts of formic, acetic, butyric, caproic, lauric, and palmitic acids in various amounts (up to 0.1 moles/liter) in the presence and absence of potassium persulfate as initiator (0.4%). On the emulsions obtained, turbidity measurements (photometer of the type  $\Phi M$  (FM) with nephelometer attachment) were conducted, as well as the determination of the surface tension according to A. Z. Kotukov and Ye. I. Lototskiy (Zavodsk. laboratoriya 2, 1100, 1953), the viscosity, and solubilizing ability (on the photoelectric colorimeter MQ-1 (MF-1) on the basis of the color intensity of Sudan III solutions and the solubilization of ethyl benzene by refractometer). The mean radius of

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the latex particles was determined on the basis of the light scattering of the dilute solutions. Results: According to their effect, the added aliphatic acid salts may be divided into two groups: (1) with low chain length up to and including Na-caproate; (2) with longer chains. With increasing chain length as well as increasing concentration, the salts of the first group cause a turbidity increase and, thus, an increase of the micellar weight of the emulsifier solution (partial precipitation of the emulsifier taking place at concentrations of 0.1 moles/liter). The viscosity of synthetic latex also increases, while the surface tension and rate of solubilization decrease (rate of solubilization without addition 8 - 12 hr, with 0.2 moles/liter sodium acetate 23 - 25 hr). The critical concentration of the micellar formation (CCM) of Nekal decreases with increasing salt concentration (sodium acetate 0.01 moles/liter CCM =  $7.9 \cdot 10^{-3}\%$ ; 0.1 moles/liter CCM =  $4 \cdot 10^{-3}\%$ ; sodium butyrate at 0.01 moles/liter CCM =  $7.6 \cdot 10^{-3}\%$ , at 0.1 moles/liter CCM =  $3.7 \cdot 10^{-3}\%$ ). The solubilizing ability increases with increasing chain length of the salt, but shows a maximum for salt concentrations between 0.03 and 0.05 moles/liter. The particle size increases with the salt concentration up to a content of 0.08 moles/liter, and then remains constant. The

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salts of the second group lead already in smaller amounts to stronger turbidities and, thus, to an increase of the micellar weight, but they are only slightly increased at further additions. Likewise, the surface tension is strongly reduced already at a low salt concentration, and remains completely constant at higher concentrations (over  $\sim 0.01$  moles/liter). The solubilizing ability increases up to  $\sim 0.04$  moles/liter with increasing concentration, and remains unchanged by further additions. The particle size of synthetic latex decreases with both the concentration and the chain length. The dispersion of the synthetic latexes is determined by the dispersion of the emulsifier solution used. Thus, the dispersion of latexes is variable within wide limits by suitable addition of aliphatic acid salts. There are 6 figures, 1 table, and 8 references: 7 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: H. B. Klovens, Chem. Rev. 47, 1, 1950. ✓

ASSOCIATION: L'vovskiy universitet im. I. V. Franko, Kafedra fizicheskoy i kolloidnoy khimii (L'vov University imeni I. V. Franko, Department of Physical and Colloid Chemistry). Odesskiy universitet im. Mechnikova, Laboratoriya vysokomolekulyarnykh soyedineniy (Odessa University imeni Mechnikov, Laboratory of High-molecular Compounds)

Card 3/03

15.8610

29118  
S/020/61/140/005/014/022  
B103/B110

AUTHORS: Ivanchev, S. S., Yurzhenko, A. I., and Solomko, N. I.  
TITLE: Characteristics of the kinetics of styrene polymerization initiated by tert-butyl peroxide and tert-butyl perbenzoate  
PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 5, 1961, 1079-1082

TEXT: The rate of styrene polymerization was studied at concentrations between 0.01 and 0.12 g-mol/l of the monomer, and at various concentrations of tert-butyl peroxide (BPO) or tert-butyl perbenzoate (BPB) at temperatures between 85 and 115°C. For comparison, the styrene polymerization was studied in the presence of benzoyl peroxide (BP). Polymerization took place in the bulk of the monomer, and also in an emulsion stabilized with a 0.2% Solvar solution. The kinetic conditions in these two cases were identical. The dependence of polymerization degree on time was found to be linear only with a low degree of polymerization of BPO and BPB (up to 20 - 30%). With a high degree of conversion, however, self-acceleration of the process sets in. At a polymerization temperature of 85°C, the rate constant of the thermal decomposition of BP dissolved in ethyl benzene, is  $4.4 \cdot 10^{-3}$ ; for BPB:

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# Characteristics of the kinetics...

6.1.10<sup>-4</sup>. Under these conditions BPO is decomposed extremely slowly.. The dependence of the intrinsic viscosity  $[\eta]$  of the polymers on concentration and nature of the initiators, decreases, as expected, in the sequence BP - BzB - BPO. With BP and BPB, the molecular weights of the polymers decrease, as the concentration of the initiator increases. In the case of BPO, the molecular weight does not depend on the concentration. The  $[\eta]$  of the polymers slightly increases with BPO concentrations between 0.01 and 0.10 mole/l of the monomer. This contradicts the rule saying that the molecular weight of the polymer decreases due to an increase in the initiator concentration. In polymerization initiated by BPO,  $[\eta]$  of the polymers decreases by 50% due to a temperature rise from 85 to 105°C during the process. The polymerization rate, however, increases by one order of magnitude. With a BP conversion of up to 50%,  $[\eta]$  is increased but slightly. Above this degree of polymerization,  $[\eta]$  remains constant. With BPB and especially with BPO,  $[\eta]$  increased even at high degrees of conversion. If the polymerization temperature was maintained for some time after the process,  $[\eta]$  still increased considerably, even though the monomer was used up. This did not occur with BP. Such results are related to the high activity of the radicals

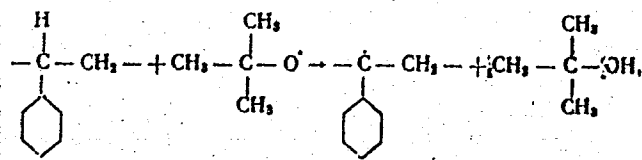
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Characteristics of the kination...

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$\text{CH}_3-\text{C}(\text{CH}_3)_2-\text{O}^\bullet$  forming during BPO and BPB decomposition. They interact with the tertiary C atoms of the polymer chain:



Thus, free polymer radicals are formed which continue growing in the presence of the monomer. If the monomer is absent, the free radicals combine and yield a polymer of higher molecular weight. Unless the temperature is extremely high, the initiator amount required will still be present after the polymerization is finished due to the high thermal stability of peroxides. At high temperatures, the initiator may be used up

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Characteristics of the kinetics...

at the end of the process. In this case, heating does not affect the molecular weight, and  $[\eta]$  in this process will be changed but slightly. The high "initiating" activity of BPO and BPB is due to a kind of graft homopolymerization. There are 3 figures, 1 table, and 5 references: 2 Soviet and 3 non-Soviet. The four most important references to English-language publications read as follows: W. P. Hohenstein, H. Mark, Polymer Sci., 1, 127 (1946); E. Tromsdorf, E. E. Schildknecht, High Polymer, 10, 69 (1956); R. P. Perry, K. P. Seltzer, Modern Plastics, 25, No. 3, 216 (1947); J. H. Reley, F. F. Rust, W. E. Vaughan, J. Am. Chem. Soc., 70, 88 (1948); N. A. Milas, D. M. Surgenor, *ibid.*, 68, 205, 643 (1946).

ASSOCIATION: Odesskiy gosudarstvennyy universitet im. I. I. Mechnikova  
(Odessa State University imeni I. I. Mechnikov)

PRESENTED: May 19, 1961, by B. A. Kazanskiy, Academician

SUBMITTED: May 11, 1961

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5.3830

25822

S/020/61/140/006/021/030  
B103/B101

AUTHORS: Murzenko, A. I., Ivanchev, S. S., and Galibey, V. I.  
TITLE: Thermostability and initiating activity of diacyl peroxides  
of paraffinic and phenylcarboxylic acids  
PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 6, 1961,  
1348-1351

TEXT: The authors studied the dependence of the initiating activity of diacyl peroxides in homologous series: A) of paraffinic acids on the length of the organic radical, and B) of phenylcarboxylic acids on the number of methylene groups between the phenyl ring and the peroxide group on polymerization of 1) styrene and 2) methyl methacrylate. Therefore, peroxides of 14 acids (a) - n)) were synthesized according to the methods of Ref. 5 (see below) (see Table 1 and the legend below). The polymerization rate of 1) was studied (dilatometrically) in mass and in suspension, and that of 2) in mass. Table 1 shows the rate constants and activation energies of the decomposition of a) - n), which were determined based on

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the rate of their thermal decomposition in ethyl benzene. Based on these data, it has been found that the thermostability of A is only slightly changed by lengthening of their hydrocarbon radicals. The differences in thermostability are, however, remarkable in series B. d is the most stable, whereas the next member in the series, a, is the least stable and decomposes rather quickly at low temperatures. Further on in the series, the stability of the peroxides increases. Thus, c is closely related as to stability to the peroxides A, which corresponds to its structure. These data were compared with the kinetics of the polymerization initiated by a) - n). The rate of generation of free radicals is a function of the decomposition rate of the peroxides. Acceleration of the generation effects more rapid polymerization, whereby the molecular weights of the polymers decrease. Since the radicals are of analogous structure, their activity is, presumably, similar. To 1): The polymerization rate does not vary analogously to the thermostability of the peroxides. The A are much better initiators for styrene than d. Although a decomposes rapidly, it is but slightly active in the polymerization of styrene. A different mechanism is assumed for the thermal decomposition of a. While the  $K \cdot 10^3$

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Thermostability and initiating...

remain practically the same for A, the polymerization initiated by A does not proceed with equal rates. The rates of polymerization and thermal decomposition of the peroxides do not vary consistently. For instance, the molecular weights of the polymers initiated by d are the lowest in spite of the slowest polymerization. The molecular weight of the polymers increases, when passing to b. The most rapid polymerization is effected by A, the molecular weights being equally the highest. These data do not agree with the equations:  $V = \left[ \frac{k_{incr}}{k_{break}} \right]^{1/2} \cdot k_{init}^{1/2} [M] [\Pi]^{1/2}$  (I);

$\bar{P} = \left[ \frac{k_{incr}}{k_{break}} \right]^{1/2} \cdot k_{init}^{1/2} \cdot [M] / [\Pi]^{1/2}$  (II), where V is the polymerization rate, [M] the monomer concentration, [Π] the concentration of the initiator,  $k_{break}$ ,  $k_{incr}$ ,  $k_{init}$  are the constants of the breaking, increase, and initiation reactions, and  $\bar{P}$  is the average length of the polymer chains (on breaking by radical recombination). This discrepancy is explained by the change of the breaking of the polymer chains on polymerization, although the total character of the free radicals is the same. The change of the

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concentration of the free radicals is determined in the stationary process as follows:  $dR/dt = k_0[I] - k_2[R_0]^2 - k_3[\sum M_n R] R_0 - k_4[M_n R]^2$ , where  $R_0$  are primary radicals,  $M_n R$  polymer radicals,  $k_0, k_2, k_3, k_4$  constants of the corresponding reactions. Thus, the breaking of the chains may occur on interaction between primary and polymer radicals (benzoyl peroxide) and between the polymer radicals themselves. This is the case for paraffin peroxides, where higher rates and molecular weights develop. To 2) Here, the kinetics agree completely with the two equations and vary consistently with the decomposition rate of the peroxides. There are 4 figures, 1 table, and 6 references: 1 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: Ref. 5: L. S. Silbert, D. Swern, J. Am. Chem. Soc., 81, 2364 (1959); D. F. De Tar, L. A. Carpino, J. Am. Chem. Soc. 77, 6370 (1955); W. Kern, K. Kossman, M. Rugenstein, Macromol. Chem., 15, 122 (1955).

ASSOCIATION: Odesskiy gosudarstvennyy universitet im. I. I. Mechnikova  
(Odessa State University imeni I. I. Mechnikov)

Card 4/5

Thermostability and initiating...

29822  
S/020/61/140/006/021/030  
B103/B101

PRESENTED: May 19, 1961, by B. A. Kazanskiy, Academician

SUBMITTED: May 10, 1961

Table 1

Table 1: Rate constants and activation energies of the decomposition reaction of the peroxides.

Legend: (1)  $K \cdot 10^3$  for;  
(2) E, kcal/mole; (3) per-  
oxide; a) phenylacetic,  
b) hydrocinnamic, c) phenyl-  
butyric, d) benzoic,  
e) butyric, f) valeric,  
g) caproic, h) enanthic,  
i) caprylic, j) pelargonic, k) capric, l) lauric, m) palmitic, and n)  
stearic acid peroxide.

Перекись 3	K·10³ при		E, ккал/моль 2	Перекись 3	K·10³ при		E, ккал/моль 2
	73,5°	85,0° C			73,5°	85,0° C	
а ПБ	1,19	4,44	31,2	а ПЭК	4,6	17,7	30,7
а ПФУК	2,8 (0°C)	36,0 (25°C)	22,0	а ПКЛК	4,3	18,7	29,9
а ПФКК	5,0	20,3	30,1	а ППК	4,7	19,3	29,7
а ПФМК	3,0	14,8	31,0	а ПКНК	4,6	19,0	30,1
а ПМК	4,1	16,7	30,1	а ПЛ	4,8	19,0	30,1
а ПВК	4,1	16,5	30,0	а ППАК	4,7	19,7	30,0
а ПКАК	4,1	17,4	30,7	а ПСК	4,6	18,9	29,9

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S/069/63/025/001/006/003  
B101/B186

AUTHORS: Storozh, G. F., Yurzhenko, A. I.

TITLE: Effect of aliphatic alcohols on the polymerization rate of styrene in emulsion

PERIODICAL: Kolloidnyy zhurnal, v. 25, no. 1, 1963, 77-81

TEXT: The purpose of this study was to explain the effect of organic additives on the micellar structure of soap and thus also on the emulsion polymerization of hydrocarbons. Styrene was polymerized in a dilatometer at 20°C and a ratio of hydrocarbon : aqueous phase = 1 : 9. Sodium stearate (0.05 moles/l) or sodium oleate (0.1 moles/l) were used as emulgator. The reaction was initiated with 0.4% potassium persulfate calculated for the aqueous phase. The polymerization rate and the molecular weight of polystyrene were determined. The effects of propyl, butyl, amyl, and hexyl alcohols in the presence of sodium stearate were studied. At a certain concentration, a maximum of polymerization rate and of molecular weight occurred for each alcohol. The optimum concentration was 0.87 moles/l for propyl alcohol, 0.2 moles/l for amyl alcohol, and

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## Effect of aliphatic alcohols ...

0.147 moles/l for hexyl alcohol. The effect of chain length of the alcohol radical on the polymerization rate and molecular weight of the polymer was found to be the same also in the presence of sodium oleate. The data given are optimum alcohol concentration (moles/l), maximum polymerization rate (% per min), and molecular weight of the polymer: Methanol 1.87, 0.95, 78750; propanol 0.12, 0.90, 79450; hexanol 0.009, 1.47, 88840; octanol 0.0075, 1.63, 104200; decanol 0.0019, 2.05, 123710. The colloidal properties of the alcoholic-aqueous solution of soap, such as viscosity, electrical conductivity, critical concentration of micelle formation, etc. change in the same way. Conclusions: The surface of the alcohol - soap micelles is decreased by addition of small amounts of alkanols. Thus, the solubility of the monomer in the micelles increases as well as the polymerization rate. Low concentrations of alcohols which are surface-active substances intensify the stabilizing effect of soap, but higher concentrations change the structure. A true, noncolloidal soap solution forms in the presence of low-molecular alcohols, whereas a new soap - alcohol - water phase forms in the presence of high-molecular alcohols. The latter phase can be recognized by the turbidity occurring after the addition of amyl, hexyl, or octyl alcohol to the aqueous

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solution of sodium oleate. Both processes reduce the size of micelles, thus inhibiting the polymerization rate. There are 3 figures and 1 table.

ASSOCIATION: L'vovskiy universitet im. I. Franko, Kafedra  
fizicheskoy i kolloidnoy khimii (L'vov University imeni  
I. Franko, Department of Physical and Colloid Chemistry)

SUBMITTED: November 20, 1961

Card 3/3

GALIBEY, V.I.; YURZHENKO, A.I.; IVANCHEV, S.S.

Polymerization of styrene initiated by peresters based on tert-butyl hydroperoxide and on some paraffinic and phenylcarboxylic acids. Ukr.khim.zhur. 29 no.12:1282-1289 '63. (MIRA 17:2)

1. Odesskiy gosudarstvennyy universitet im. I.Mechnikova.

YURZHENKO, A.I.; VIL'SHANSKIY, V.A.

Emulsion polymerization with surface-active initiation. Dokl.  
AN SSSR 148 no.5:1145-1147 F '63. (MIRA 16:3)

1. Predstavleno akademikom P.A.Rabinderom.  
(Polymerization) (Surface-active agents)

IVANCHEV, S.S.; YURZHENKO, A.I.; GALIBEY, V.I.

Evaluation of the initiating activity of peroxides in polymerization reactions. Dokl. AN SSSR 152 no.5:1159-1161 0 '63. (MIRA 16:12)

1. Odesskiy gosudarstvennyy universitet im. I.I.Mechnikova.  
Predstavleno akademikom P.A.Rebinderom.

IVANCHEV, S.S.; YURZHENKO, A.I.; SOLOMKO, N.I.

Polymerization of styrene in emulsion stabilized by a two-component emulsifier mixture. Koll. zhur. 26 no.6:670-674, N-D '64  
(MIRA 18:1)

1. Odesskiy universitet.

IVANCHEV, S.S.; GALIBEY, V.I.; YUIZHENKO, A.I.

Characteristics features of styrene polymerization at advanced stages of conversion initiated by diacyl peroxides. Vysokom. soed. 7 no.1:74-79 Ja '65. (MIRA 18:5)

1. Odesskiy gosudarstvennyy universitet imeni Mechnikova.

IVANCHEV, S.S.; YURZHENKO, A.I. [Iurzhenko, O.I.]; ANISIMOV, Yu.N.  
[Anisimov, Iu.M.]

Infrared spectra of symmetrical diacyl peroxides. Dop. AN URSR  
no.8:1063-1066 '65. (MIRA 18:8)

1. Odesskiy gosudarstvennyy universitet.

L 34501-65 EMI(m)/EPF(c)/ENP(j)/T Pch4/Pr-4  
ACCESSION NR: AP5014310

RM  
UR/0073/65/031/006/0603/0607  
542.952.6.547.539.141

AUTHOR: Ivanchev, S. S.; Solomko, N. I.; Yurzhenko, A. I.

TITLE: Diacyl peroxide initiated polymerization of styrene in emulsion

SOURCE: Arazinskiy khimicheskiy zhurnal, v. 31, no. 6, 1965, 603-607

TOPIC: diacyl peroxide, styrene emulsion, polymerization, latex, aliphatic compound

ABSTRACT: The purpose of this work was to investigate the effect of the structure of diacyl peroxides on the kinetics of latex polymerization. This article describes the investigation of emulsion polymerization of styrene initiated by diacyl peroxides of butyric, valeric, caproic, heptanoic, caprylic and palmytic acids and compares the reaction rates to the polymerization rate initiated by benzoyl peroxide. It was found that the polymerization of styrene in diacyl peroxides of aliphatic acids decreases with an increase in the length of the carbon chain (fig. 1 of the Enclosure). The degree of dispersion in the synthetic latexes changes in the same order. In the case of peroxides of lower aliphatic acids (dibutyl and di-valeryl peroxides) the initial rates of polymerization are great but as the reac-

CARD 103

L 94502-65

ACCESSION NR: 495014310

tion proceeds the process is retarded. The most favorable initiators of polymerization in the investigated series are diacetyl peroxide and diethanthyl peroxide. This initiation ability is comparable to the activity of hydroperoxides. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: Odesskiy gosudarstvennyy universitet im. I. I. Mechnikova (Odessa State University)

SUBMITTED: 14 Jan 64

ENCL: 01

SUB CODE: OC

NO REF. 000

OTHER: 000

Card 2/2

L 54502-65  
ACCESSION NR: AP5014310

ENCLOSURE: 01

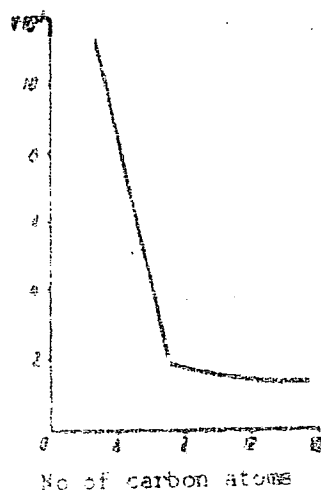


Fig. 1. The rate of polymerization as a function of the carbon chain length in the hydrocarbon radical joined to the peroxide group.

Card 3/3

GALIBET, V.I.; IVANCHEV, S.S.; YURZHENKO, A.I.

Activity of free radicals formed in the decomposition of  
diacyl peroxides during styrene polymerization. Vysokem.  
sred. 7 no.1661746-1752 0 '65.

(MIRA 16:11)

1. Odeskii gosudarstvennyi universitet.

IVANCHEN, S.S.; YURENENKO, A.I.; ANISTMOV, Yu.N.

Spectral study of symmetrical diacyl peroxides. Zhur. fiz.  
khim. 39 no.8:1900-1905 Ag '65. (MIRA 18:9)

1. Odeskii gosudarstvennyi universitet imeni Mechnikova.

ANISIMOV, Yu.N.; IVANCHEV, S.S.; YURZHENKO, A.I.

Quantitative determination of diacyl peroxides by infrared  
spectroscopy. Zhur. anal. khim. 21 no. 1:113-118 '66  
(MIRA 19:1)

1. Odesskiy gosudarstvennyy universitet imeni Mechnikova.

L 41219-00 (M//S) 1/1 10/10 RM

ACC NR: AP6023210

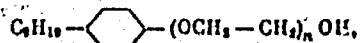
SOURCE CODE: UR/0020/66/168/006/1342/1345

AUTHOR: Vil'shanskaya, N. Ya.; Yurzhenko, A. I.ORG: Odessa State University im. I. I. Machnikov (Odesskiy gosudarstvennyy universitet)TITLE: Characteristics of the process of polymerization in an emulsion stabilized with nonionogenic emulsifiers

SOURCE: AN BSSR. Doklady, v. 168, no. 6, 1966, 1342-1345

TOPIC TAGS: emulsion polymerisation, polystyrene

ABSTRACT: In order to clarify the influence of the hydrophilic part of the molecule of ionogenic emulsifiers on the emulsion polymerization of styrene, the authors studied polyglycol ethers (products of condensation of nonylphenol with various amounts of ethylene oxide) of the general formula



where  $n = 4, 10, 13, 30$ . These emulsifiers were added in various quantities to the polymerization system, and the yield of polystyrene was measured as a function of time. This yield was found to be independent of the content of emulsifiers with  $n$  from 4 to 13. In the case of  $n = 30$ , the polymer yield rose with the emulsifier con-

Card 1/2

UDC: 541.18.05

L 41219-66

ACC NR: AP6023210

tent, and the polymerization rate increased in direct proportion to this content, indicating a latex polymerization. From  $n = 4-13$  to  $n = 30$  there is a sharp increase in polymerization rate, indicating a definite influence of the hydrophilic part of the emulsifier molecule on the course of the emulsion polymerization reaction. The viscosity and hence the molecular weight of the polymers increases with the degree of polymerization for  $n = 4$  to 13, in contrast to  $n = 30$ . This suggests that the change in the hydrophilic part of the emulsifier molecule causes a substantial change in the topochemistry of the polymerization: when  $n = 4$  to 13, the process takes place in a dispersion of droplets, and the emulsifier acts only as a stabilizer, whereas in the case of  $n = 30$ , a micellar mechanism of polymerization occurs. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 07/ SUBM DATE: 12Oct65/ ORIG REF: 005/ OTH REF: 001

Card 2/2 mcp

YURZHENKO, . F.

Chemical Abst.  
Vol. 43 No. 3  
Apr. 25, 1954  
Rubber and Other Elastomers

② 3  
The state of dispersion of synthetic latexes with respect to  
its dependence on the nature and concentration of the  
emulsifier and monomer. V. P. Gulyakov and A. P.  
Yurzhenko. *Colloid J. (U.S.S.R.)* 14, 440-442 (1952) (Engl.  
translation) — See *CA* 47, 3601c. H. L. H.

S/081/62/000/024/016/052  
B117/B186

AUTHORS: Yurzhenko, O. I., Ivanchov, S. S.

TITLE: Effect of emulsifier composition on the kinetics of emulsion polymerization of styrene

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24 (II), 1962, 829 - 830, abstract 24P59 (Dopovidi ta povidoml. L'vivs'k. un-t, no. 9, part 2, 1961, 84 - 85 [Ukr.] )

TEXT: The polymerization kinetics of styrene in an emulsion was studied in the presence of the salts of fatty acids having hydrocarbon chains of different lengths (stabilizers are sodium oleate or potassium palmitate). Addition of fatty acid salts having  $\geq 8$  C atoms in the chain was shown to increase the polymerization rate, molecular weight of the polymer and dispersion degree of latexes. The molecular weight of the polymer increases with the number of C atoms in the chain of the fatty acid salt. Furthermore it was shown that the effect of fatty acid salts, having  $\leq 7$  C atoms, on the polymerization kinetics depends on the concentration: small amounts increase the polymerization rate and molecular weight slightly; large amounts inhibit the process, reducing the dispersion  
Card 1/2

Effect of emulsifier composition on ...

S/081/62/000/C24/016/052  
B117/B186

degree of latexes and the molecular weight. [Abstracter's note: Complete translation.]

Card 2/2

S/081/62/000/024/015/052  
B117/B186

AUTHORS: Vil'shana'kiy, V. A., Yurzhenko, O. I.

TITLE: Study on the activity of emulsifiers, substituted alkyl pyridine derivatives, during emulsion polymerization of styrene

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24 (II), 1962, 829, abstract 24P58 (Dopovidi ta povidoml. L'viva'k. un-t, no. 9, part 2, 1961, 81 - 82 [Ukr.] )

TEXT: This is a study on the kinetics of styrene polymerization in an emulsion stabilized with pentadecyl pyridine bromide and pyridine derivatives substituted in the ring, in the presence of isopropyl benzene hydroperoxide as initiator. Pyridine derivatives: Methyl pyridine with the methyl group in positions 2,4, and 3; 2,4-dimethyl pyridine and 2,6-dimethyl pyridine; 2,4,6-trimethyl pyridine; pyridine carbonic acids (picolinic, nicotinic, and isonicotinic acids) and nicotinamide. It was shown that the polymerization rate using these emulsifiers is 2 - 3 orders of magnitude higher than that in bulk. The most active emulsifiers were found to be those having an amide group in position 3 as substituent  
Card 1/2

Study on the activity of ...

S/081/62/000/024/015/052  
B117/B186

(100 % polymerization; molecular weight of the resulting polymer 150 000).  
Emulsifiers having a CH<sub>3</sub> group in position 3 are least active. [Abstracter's  
note: Complete translation.]

Card 2/2

S/081/62/000/024/017/052  
B117/B186

AUTHORS: Yurzhenko, O. I., Zarechnyuk, O. S., Ivanchov, S. S.

TITLE: Comparison of the initiating activity of some diacyl peroxides on styrene polymerization

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24 (II), 1962, 830, abstract 24P60 (Dopovidi ta povidoml. L'vivs'k. un-t. no. 9, part 2, 1961, 86 - 87 [Ukr.] )

TEXT: The thermal stability and initiating activity of diacyl peroxides of the phenyl carboxyl series (diacyl peroxide of benzoyl, hydrocinnamic and phenyl butyric acids) and paraffin series (diacyl peroxides of dien-anthyl, dicaprylyl, diperargonyl, dicaprynyl, dilaurin, dipalmityl, and distearyl) were studied during styrene polymerization in bulk and in emulsion. In the phenyl carbonyl series, the diacyl peroxide of benzoyl is most active and the diacyl peroxide of hydrocinnamic acid, least. The thermal stability changes in the same way as the initiating activity. Diacyl peroxides of the paraffin series are more active than those of the phenyl carbon series: Polymerization is faster and the resulting polymer has a higher molecular weight. The thermal stability of diacyl peroxides  
Card 1/2

Comparison of the initiating ...

S/081/62/000/024/017/052  
B117/B186

of the paraffin series is independent of the length of the hydrocarbon radical and is constant for the peroxides studied. [Abstracter's note: Complete translation.].

Card 2/2

YURZHENKO, P.I.

Unusual developmental anomaly of the liver. Khirurgia no. 3:77  
Mr '54. (MLRA 7:5)

1. Iz khirurgicheskogo otdeleniya (zav. - dotsent P.I.Yurzenko)  
Khersonsko / oblastnoy bol'nitsy (glavnyy vrach K.G.Emets).  
(LIVER, abnormalities, (ABNORMALITIES,  
\*hypoplasia) \*liver hypoplasia)

YURZHENKO, P.I., dots.

Surgical treatment of benign tumors and cysts of the mediastinum.  
Nov.khir.arkh. no.5:80-84 S-O '57. (MIRA 10:12)

1. Khirurgicheskoye otdeleniye (zav. - dots. P.I.Yuzhenko) Kherson-  
skoy bol'nitsy. Adres avtora: Kherson, Oblastnaya bol'nitsa.  
(MEDIASTINUM--SURGERY) (SYSTS)

GRITSAN, D.N.; KUCHER, R.V.; YURZHENKO, R.M.

Dispersed electrolytic depositions of bismuth. Nauk.zap.L'viv.un.  
21:63-69 '52. (MLA 10:7)

1. Kafedra fizicheskoy i kolloidnoy khimii.  
(Bismuth) (Electroplating)

ZEMLYANSKIY, N.I.; DRACH, B.S.; prinalni uchastiyo: GOLECHEK, A.A.;  
YURZHENKO, S.A.

Synthesis of salts of some O,O-diaryldithiophosphoric acids. Zhur.-  
ob.khim. 32 no.6:1962-1966 Ja '62. (MIRA 15:6)  
(Phosphorodithioic acid)



*C*

Determining (cont.)  
Determination of velocities of swelling and solution of  
highly polymerized substances. T. I. Yurzenko. Col-  
loid J. (U.S.S.R.) 5, 147-52 (1930). The rate of swell-  
ing is measured in a dilatometer. The min. vol. indicat-  
ing is measured in a dilatometer. The time when the rate of soln. overtakes that of swelling.  
The app. was tested with Na divinyl rubber in C.H<sub>4</sub>. The  
reproducibility was better than in the app. of Lottermooser  
(L. and Radstock, C. A. 22, 1234). J. J. Bikerman.

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

**Investigation of various types of peroxides as initiators of emulsion polymerization.** T. I. Yurzhenko, G. N. Gromova, and V. H. Khalitser. *J. Gen. Chem. (U.S.S.R.)* 16, 1905-20(1946).—Detns. of the distribution between water and org. solvents, catalysis of the polymerization of 1,3-butadiene, stability, and effect on the properties of the polymer obtained, were made on 6 inorg. and org. peroxides: trimethylcarbinol hydroperoxide (I); dimethylcarbinol hydroperoxide (II);  $\text{NaHO}$  (0.98% active O) (III);  $\text{H}_2\text{O}_2$  (IV);  $\text{K}_2\text{S}_2\text{O}_8$  (V); and  $\text{H}_2\text{O}_2$  (3-5% aq. soln.) (VI). Distribution coeffs. between water and org. phase, water and isoprene, and 1.5% aq.  $\text{NaOH}$  and isoprene, were detd. for I, III, IV, V, VI, at 25 and 60°. The content of the water-sol. peroxides in the org. phase was almost const. with time but fell rapidly in the aq. phase, particularly at higher temp. The soly. of IV was almost const. with time in the org. phase, but increased in decreased with time in the org. phase, but increased in water; I was almost equally distributed between water and the org. phase at 25°, increasing somewhat in the latter at 60°. From measurements on the rate of polymerization in the presence of an amt. of peroxide equiv. to 0.1% active O (with respect to  $\text{C}_4\text{H}_6$ ), with a 3% soln. of Na oleate (with a 0.32 N excess  $\text{Na}_2\text{CO}_3$ ) as emulsifier, phase ratio 1:1, at 60°, from readings of the contraction of the liquid, the order of decreasing catalytic activity was: I (depth of polymerization = 60% reached in 8 hrs.), III (I = 60% in 20 hrs.), IV (I = 20% in 30 hrs.), VI (I = 10% in 38 hrs.). At 40°, only the tertiary

ales. of the I and II type were active; no polymerization occurred with any other peroxide; with I, I = 40 was attained in 10 hrs., with II in 10 hrs. From detns. of the rate of decompn. in both water and in the above 3% Na oleate soln. (IV in  $\text{C}_4\text{H}_6$ ), the stability decreased in the order: I (unimol. rate const.  $k$ , in min., = 0.000671 at 60°), V ( $k$  = 0.00125), IV ( $k$  = 0.00106), III and VI the order: I (unimol. rate const.  $k$ , in min., = 0.000671 at 60°), V ( $k$  = 0.00125), IV ( $k$  = 0.00106), III and VI ( $k$  = 0.238 and 0.360); decompn. complete in 10-15 min. in 1-1.5% soln.). Addn. of VI most markedly, accelerated the rate of decompn. of the highly stable peroxide somewhat less,  $\text{NH}_4\text{OH}$  least; the effect was strongly enhanced in a 3% Na oleate soln. In the same medium, the rate of decompn. of the highly stable peroxides (such as I) was much lower than the rate of polymerization; for peroxides of medium stability (such as V) decompn. was faster than polymerization, for the low-stability IV, much faster. For the least stable III and VI, polymerization of isoprene was found to lag after decompn. to such an extent that polymerization practically only started when decompn. was nearly complete; in this case the peroxides undoubtedly are only active through their catalytic action of peroxides of mol. O. In contrast, the closeness of the rate curves of decompn. and polymerization, evidently is due to at. O, whereas catalysis by the highly stable tertiary ales. (I, II) proceeds over the radicals  $\text{Me}_2\text{C}$  and  $\text{COH}$ . Variation of the concn. of I, at 10 and 50°, from 0.01 to 0.1% active O increased the rate of polymerization of  $\text{C}_4\text{H}_6$ ; further increase resulted in a decrease of the rate; at

CA

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Synthesis of the hydroperoxide of 1,1-diphenylethane and thermal decomposition of tertiary hydroperoxides. T. I. Yurzhenko, D. K. Tolopko, and V. N. Puchin (Lvov Polytech. Inst.), *Doklady Akad. Nauk S.S.S.R.* 74, 85-8 (1950).—Oxidation of  $\text{Ph}_2\text{CHMe}$  at 65–70° in a stream of  $\text{O}_2$  flowing at 6–8 ml./min. gave a high percentage (24% conversion in 300 hrs.) of a hydroperoxide which crystallizes partly at room temp., more completely (65–70% of the total formed) on ice. The product, analyzing for  $\text{Ph}_2\text{CHO}_2\text{Me}$ , m. 82°, has the structure  $\text{Ph}_2\text{CMe.O.O.H}$ . The kinetics of the decompn. in soln. in methylstyrene were detd. for 4 hydroperoxides, including the above new product. The decompn. is of the 1st order, with the following values of the rate const.,  $k \times 10^3$  at 70°, 85°, 100°, (and the activation energy  $E$ ):  $\text{Me}_3\text{C.O.O.H}$ , 0.289, 0.669, 2.390  $\text{sec}^{-1}$  (17.9 kcal./mole);  $\text{PhMe}_2\text{C.O.O.H}$ , 0.411, 1.344, 3.962 (19.2);  $\text{PhMeC.O.O.H}$ , 1.455, 4.866, 15.407 (20.0);  $\text{Ph}_2\text{C.O.O.H}$ , 2.592, 7.284  $\text{sec}^{-1}$  (18.2 kcal./mole). The frequency factors are, resp.,  $7.4 \times 10^9$ ,  $7.1 \times 10^9$ ,  $8.1 \times 10^9$ , and  $3.7 \times 10^9 \text{ sec}^{-1}$ . N. Thon

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(A

The initiating activity of tertiary hydroperoxides and their effect on the degree of polymerization. F. I. Yegorchenko, V. A. Puchin, and K. S. Grigor'eva (Lvov Polytech. Inst.). *Doklady Akad. Nauk S.S.S.R.* 15, 547-50 (1959).—Rates of polymerization of  $\text{PhCl}; \text{Cl}_2$  in the liquid phase were measured by dilatometry in the presence of  $\text{Me}_2\text{COOH}$  (I),  $\text{PhMe}_2\text{COOH}$  (II),  $\text{Ph}_2\text{MeCOOH}$  (III), and  $\text{Ph}_3\text{COOH}$  (IV), at different concns.  $c$  of the hydroperoxide. With I, II, and III, the rates were const., whereas with IV the rate was const. during the 1st 5 hr., then fell and remained at the const. lower value for another 5 hr. The rates  $r$  (in  $\text{M}/\text{l.}/\text{hr.}$ ), at  $c = 0.00566, 0.0566, 0.1132 \text{ M}/\text{l.}$ , were I at  $70^\circ, 0.0609, 0.150, 0.300$ ; at  $85^\circ, 0.222, 0.509, 0.609$ ; at  $100^\circ, 0.653, 1.560, 1.900$ ; II at  $70^\circ, 0.113, 0.275, 0.375$ ; at  $85^\circ, 0.337, 0.975, 1.275$ ; at  $100^\circ, 0.950, 3.55, 5.100$ ; III at  $70^\circ, 0.185, 0.650, \text{—}$ ; at  $85^\circ, 0.435, 1.655, \text{—}$ ; at  $100^\circ, 1.275$ , then instantaneous; IV (1st and 2nd 5-hr. period) at  $70^\circ, 0.173$  and  $0.160, 0.314$  and  $0.263, 0.230$  and  $0.208$ ; at  $85^\circ, 0.392$  and  $0.303, 0.460$  and  $0.383, 0.322$  and  $0.283$ ; at  $100^\circ$  (1st period only)  $0.700, 0.775, 0.697$ . The initiating activity increases in the order I, II, III, i.e. in the same order as the rates of thermal decoupling. (C.A. 48, 2916a). Introduction of a Ph group into the tertiary radical increases the initiating activity; introduction of a Me group decreases it. The behavior of IV is explained by formation of a free  $\text{Ph}_2\text{C}$  radical, which is confirmed by the appearance of the characteristic orange-yellow color. The mean mol. wts.  $M_n$  detd. by viscometry, at  $c = 0.00566, 0.0566, 0.1132$ , were I at  $70^\circ, 10^{-4} M = 8.1, 4.7, 2.9$  (without initiator 13.7); at  $85^\circ, 7.2, 3.7, 2.6$  (without, 10.7); at  $100^\circ, 6.9, 3.6, 2.8$  (without, 9.5); II at  $70^\circ, 7.4, 3.9, 2.1$ ; at  $100^\circ, 5.3, 2.6, \text{—}$ ; III at  $70^\circ, 5.9, 1.8, \text{—}$ ; at  $100^\circ, 4.2, 1.1, \text{—}$ ; IV at  $85^\circ, 5.0, 2.2, \text{—}$ . The product  $M_p$ , at equal  $c$  and temp., increases with increasing initiating capacity of the hydroperoxide; i.e. at equal  $r$  and temp.,  $M$  increases with the initiating capacity. Consequently, more active hydroperoxide initiators produce polymers of a higher degree of polymerization. N, T.

Chemical Abst.  
Vol. 48  
Apr. 10, 1954  
Organic Chemistry

A study of tertiary alkyl and aryl-substituted hydroperoxides as to synthesis, decomposition, and initiating activity. T. I. Yur'chenko, *Kin. i Fiz. Khim. Vysokomol. Soedin.*, 1952, 61-8. The following order of increased rate of thermal decomposition was found:  $\text{Me}_3\text{COOH}$  (I),  $\text{PhMe}_2\text{COOH}$  (II),  $\text{Ph}_2\text{COOH}$  (III), and  $\text{MePh}_2\text{COOH}$  (IV). The initiation activity (on styrene) increases in the order I, II, IV, III is least active since in its decomposition forms the  $\text{PhO}\cdot$  radical. The kinetics of the thermal decomposition can be given as follows for the 4 substances: I,  $k = 0.74 \times 10^4 e^{-12000/RT}$ ; II,  $1.71 \times 10^4 e^{-11000/RT}$ ; IV,  $0.81 \times 10^4 e^{-10500/RT}$ ; III,  $0.37 \times 10^4 e^{-10500/RT}$ . The mol. wt. of the polymer increases with increased activity of the hydroperoxide. Passage of cry O at 65-70° into  $\text{Me}_2\text{CH}_2$ , 320 hrs. gave a 28.5% concn. of IV on chilling to crystallized, m. 83° (from petr ether-EtOAc).  
G. M. Kosolapoff

YURZHENKO, T. I.

USSR/Chemistry - Polymerization

1 Sep 53

"The Characteristics of the Initiating Action of  
Tertiary Hydroperoxides in Emulsion Polymerization,"  
T. I. Yurzhenko, V. A. Puchin, and K. S. Grigor'yeva,  
Lvov Polytech Inst

DAN SSSR, Vol 92, No 1, pp 97-100

Studied the specific role of water as an emulsion  
medium in the initiating process in the polymerization  
of unsatd compds in the heterogeneous systems contg  
one of four tertiary hydroperoxides: ter-butyl hydro-  
peroxide, phenylisopropyl hydroperoxide, 1,1-diphenyl-  
ethane hydroperoxide, or triphenylmethyl

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hydroperoxide and compared results with those  
observed in the presence of benzoyl peroxide and  
or potassium persulfate. Presented by Acad A. Ye.  
Arbuzov 2 Jul 53.

**"APPROVED FOR RELEASE: 09/19/2001**

**CIA-RDP86-00513R001963220020-6**

**APPROVED FOR RELEASE: 09/19/2001**

**CIA-RDP86-00513R001963220020-6"**





7/12/75  
Oxidation reduction reaction  
Polymers are...  
in the presence of...  
The polymer is...  
colored as...  
Mullisch...

NY

66009

5.3300

807/81-59-2-28442

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 8, p 408 (USSR)

AUTHORS: Yurzhenko, T.I., Puchin, V.A.

TITLE: The Problem of the Development of a Technical Method for Obtaining  
1,1-Diphenylethane and Its Hydroperoxide

PERIODICAL: Nauchn. zap. L'vovsk. politekh. in-ta, 1957, Nr 62, pp 333 - 351

ABSTRACT: For obtaining 1,1-diphenylethane (I), which is the initial product in the synthesis of the hydroperoxide of I (II), the condensation of styrene (III) with benzene (IV) in the presence of concentrated  $H_2SO_4$  (V) as catalyst was used. A large part of IV was poured into the reactor and V was added to it. Then a mixture of the remaining IV with III was added under vigorous mixing and the mixing was continued for another 1 - 2 hours. I was separated by the neutralization of the organic layer by anhydrous  $Na_2CO_3$  and distillation. The effects of the ratios of III to V, III to IV, the rate of adding the mixture of III and IV, the reaction temperature and the concentration of  $H_2SO_4$  on the yield of I, were investigated. The best yields of I (75 - 80%) are obtained at the ratio of IV : III = 7 : 1, the application of V as a catalyst, the ratio III : V = 100 : 35, the time of adding the

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SOV/81-59-8-28442

The Problem of the Development of a Technical Method for Obtaining 1,1-Diphenylethane and Its Hydroperoxide

mixture of III and IV = 3 hours and the reaction temperature 10 - 30°C. The oxidation of I to II was carried out by passing air through I in the presence of 0.5% of pure II and 0.05% NaOH at -95 - 100°C. Under these conditions 32 - 35% of II is formed within 25 - 30 hours. The II being formed, crystallized out during standing of the cooled solution in the course of 2 - 3 days, in which case about 64% of II crystallized out. After washing of the mother liquor with a 0.5% solution of NaOH the content of II in it is ~13%, and it can be used for further oxidation.

L. Makarova

Card 2/2

AUTHORS: Yurzhenko, T. I., Grigor'yeva, K. S. 20-118-5-34/59  
Aref'yev, N. V., Vilenskaya, M. R.

TITLE: The Synthesis of Alkylated Hydroperoxides of the 1,1-Diphenyl-ethane Series by the Method of Chromatographical Isolation  
(Sintez alkilirovannykh gidroperekisey ryada 1,1-difenil-etana s primeneniym khromatograficheskogo metoda ikh vydeleniya)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 118, Nr 5, pp. 970-972  
(USSR)

ABSTRACT: It was stated (references 1-3) that the peroxidation chiefly occurs in the place of the C-linkage of the hydrocarbons (autoxidation). The reactivity of this linkage is increased in the series of the primary, secondary, and tertiary C-atom as well as under the influence (by the  $\alpha$  carbon atom) of several other structural factors: of ether oxygen, of the benzene nucleus, of a double linkage, of a system of double linkages, and others. It was interesting to investigate the influence of different alkyl radicals which effect the C-H linkage and the hydroperoxide group through the benzene

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The Synthesis of Alkylated Hydroperoxides of the 1,1-Diphenyl- 20-118-5-34/59  
ethane Series by the Method of Chromatographical Isolation

nucleus, on the process of autoxidation and on the properties of the hydroperoxides. So the problem arose how to synthesize some hydroperoxides from the 1,1-diphenylethane and to introduce in one of the benzene nuclei in the para position at the central C-atom the following alkyl radicals:  $\text{CH}_3$ (I),  $\text{C}_2\text{H}_5$ (II),  $\text{CH}(\text{CH}_3)_2$ (III), and  $\text{C}(\text{CH}_3)_3$ (IV) as well as  $\text{H-C}_3\text{H}_7$ .

As these hydroperoxides can be neither distilled nor crystallized, they were produced by the autoxidation of the corresponding hydrocarbons by means of the chromatographic method of isolation and purification. The synthesis of the initial hydrocarbons and the method of autoxidation are described. The velocity and the level of the accumulation of the hydroperoxides are given in table 2. These results show that the autoxidation of separate hydrocarbons takes place at an approximately equal velocity. At maximum velocity 0,25 - 0,35% hydroperoxide are formed. From that can be concluded that the nature of the alkyls introduced in the para position has no essential influence on the peroxidation in the place of the tertiary C-H linkage. The thermal stability of the peroxide seems to decrease with the

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The Synthesis of Alkylated Hydroperoxides of the 1,1-Diphenyl-ethane Series by the Method of Chromatographical Isolation 20-118-5-34/59

elongation of the aliphatic chain at the tertiary carbon atom. The methodology of the isolation and purification according to the chromatographical method (reference 7) is described. Table 3 gives data of the reproduced peroxides (I - V). The peroxides were also characterized by chemical methods according to their decomposition products. From the data obtained here it can be concluded that these peroxide compounds represent tertiary hydroperoxides. Their structures are explained by formulae; they can be denominated as follows: I: 1-phenyl-1-p-tolyethane-hydroperoxide; II: 1-phenyl-1-p-ethylphenylethane-hydroperoxide; III: phenyl-1-cumylethane-hydroperoxide-1; IV: 1-phenyl-1-4-tributylphenylethane-hydroperoxide-1; V: 1,1-diphenyl-n-butane-hydroperoxide-1. There are 3 tables and 10 references, 5 of which are Soviet.

ASSOCIATION: L'vovskiy politekhnicheskii institut (L'vov Polytechnical Institute)

PRESENTED: October 5, 1957, by B. A. Arbuzov, Member, Academy of Sciences  
Card 3/4 USSR

The Synthesis of Alkylated Hydroperoxides of the 1,1-Diphenyl- 20-118-5-34/59  
ethane Series by the Method of Chromatographical Isolation

SUBMITTED: October 2, 1957

Card 4/4

20640

5.3700

2209, 1164, 1273

S/020/61/136/006/016/024  
B103/B203

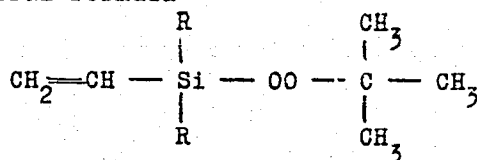
11.2140

AUTHORS: Yurzhenko, T. I. and Litkovets, A. K.

TITLE: Synthesis of unsaturated organosilicon peroxides

PERIODICAL: Doklady Akademii nauk SSSR, v. 136, no. 6, 1961, 1361-1363

TEXT: The authors synthesized the following, not yet described, unsaturated vinyl organosilicon peroxide compounds of the third, mixed type of the general formula



which contain one (I), two (II and III), or three (IV) peroxide groups.

I) Monotert.-butyl peroxide methyl vinyl ethyl-silane  $\text{CH}_2=\text{CH}-\text{Si}$

$(\text{CH}_3)(\text{C}_2\text{H}_5)\text{OO}(\text{CH}_3)_3$  was produced by reaction of methyl vinyl ethyl

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Synthesis of unsaturated...

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B103/B203

chlorosilane in petroleum ether and tert.-butyl hydroperoxide in the presence of pyridine. The structure of the peroxide produced was confirmed by its reduction. II) Di-tert.-butyl peroxide methyl vinyl-silane  $\text{CH}_2=\text{CH}-\text{Si}(\text{CH}_3)[-\text{OO}-\text{C}(\text{CH}_3)_2]_2$ . III) Di-tert-butyl peroxide vinyl ethyl silane  $\text{CH}_2=\text{CH}-\text{Si}-(\text{C}_2\text{H}_5)[-\text{OO}-\text{C}(\text{CH}_3)_2]_2$  was formed in a similar reaction from vinyl ethyl dichloro silane. IV) Tri-tert-butyl peroxide vinyl-silane  $\text{CH}_2=\text{CH}-\text{Si}[-\text{OO}-\text{C}(\text{CH}_3)_3]_3$  was produced in the same way from vinyl trichloro silane. The four peroxides synthesized are transparent liquids. Molecular weights, determined (calculated): I - 179 (188.32), II - 243.5 (248.37), III - 256 (262.4), IV - 317 (322.57). II, III, and IV decompose under explosion at 150.5°C, 159°C and 147.5°C, respectively. The peroxides mentioned are recommended in Refs. 3 and 4 as initiators of polymerization and as oxidizers. There are 7 references: 1 non-Soviet-block.

ASSOCIATION: L'vovskiy politekhnicheskii institut (L'vov Polytechnic Institute)

Card 2/3

20640

Synthesis of unsaturated...

S/020/61/136/006/016/024  
B103/B203

PRESENTED: September 28, 1960, by B. A. Arbuzov, Academician

SUBMITTED: September 24, 1960

X

Card 3/3

YURZHENKO, T.I.; DIKIY, M.A.

Autoxidation of alkyl and halo derivatives of 1, 1-diphenylethane and isopropylbenzene. Dokl.AN SSSR 137 no.5:1137-1140 Ap '61.  
(MIRA 14:4)

1. L'vovskiy politekhnicheskii institut. Predstavleno akademikom V.N.Kondrat'yevym.

(Ethane)

(Cumene)

DIKIY, M.A.; YUR'ZHENKO, T.I.

Synthesis of 9-methylfluorene hydroperoxide and study of its thermal decomposition. Dop. AN URSR no.3:390-393 '62.

(MIRA 15:5)

1. L'vovskiy politekhnicheskij institut. Predstavleno akademikom AN USSR A.I.Kiprianovym.

(Fluorene)

35012  
S/020/62/142/006/015/019  
B106/B101

11.2/40

AUTHORS:

Litkovets, A. K., and Yurzhenko, T. I.

TITLE:

Synthesis of unsaturated organosilicon peroxides

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 142, no. 6, 1962, 1316 - 1318

TEXT: Unsaturated organosilicon peroxides of the structure  $\text{CH}_2=\text{CH}-\text{SiR}_m-[-\text{OO}-\text{C}(\text{R})_3]_n$  ( $m+n=3$ ;  $n=1,2$ ) with saturated and unsaturated radicals on the silicon atom and on the tertiary C atom were synthesized. Peroxides of this type have a high thermal stability ( $150 - 170^\circ\text{C}$ ) and are, therefore, suited for vulcanization processes and high-temperature polymerizations. Mono-tert-amyl peroxide vinyl methyl ethyl silane  $\text{CH}_2=\text{CH}-\text{Si}(\text{CH}_3)(\text{C}_2\text{H}_5)\text{OOC}(\text{CH}_3)_2\text{C}_2\text{H}_5$  was produced from tert-amyl hydroperoxide and vinyl methyl ethyl chlorosilane as follows: A solution of vinyl methyl ethyl chlorosilane (0.1 moles) in 100 ml petroleum ether (boiling range  $<40^\circ\text{C}$ ) was cooled to  $-3^\circ\text{C}$ , and mixed dropwise with a mixture of 0.1 M tert-amyl hydroperoxide and 0.1 M pyridine in 50 ml of petroleum ether. Accompanied by vigorous stirring, the reaction temperature was kept below

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S/020/62/142/006/015/019  
B106/B101

Synthesis of unsaturated...

0°C. Then the reaction mixture was kept at room temperature for 3 hrs. After this, the pyridine hydrochloride was dissolved in a little water and separated off. The organic layer was washed, dried, and then vacuum distilled. The peroxide yield was 59%. The product was redistilled and showed the following characteristics: liquid with light camphor odor;

b. 38°C (1-2 mm);  $n_D^{20}$  1.4308;  $d_4^{20}$  0.8763. Hydrolysis of this peroxide in

the presence of hydrochloric acid yielded tert-amyl hydroperoxide and vinyl methyl ethyl silanol. Reduction of the peroxide with potassium iodide in acid solution or with sodium sulfite in neutral solution yielded tert-amyl alcohol and vinyl ethyl silanol. Further, the following peroxides were synthesized in a similar manner: Monocumyl peroxide vinyl methyl ethyl silane  $CH_2=CH-Si(CH_3)(C_2H_5)OOC(CH_3)_2C_6H_5$ ; 43% yield; oily liquid; b. 55°C

(0.1 mm);  $n_D^{20}$  1.4910;  $d_4^{20}$  0.9656. Di-tert-butyl peroxide vinyl propyl

silane  $CH_2=CH-Si(C_3H_7)[-OO-C(CH_3)_3]_2$ ; 45% yield; b. 76°C (1-1.5 mm);

$n_D^{20}$  1.4269;  $d_4^{20}$  0.9054. Di-tert-amyl peroxide vinyl methyl silane

$CH_2=CH-Si(CH_3)[-OO-C(CH_3)_2C_2H_5]_2$ ; 58% yield; b. 62°C (0.5-1 mm);  $n_D^{20}$  1.4312; X

Cara 2/4

S/020/62/142/006/015/019  
B106/3101

Synthesis of unsaturated...

$d_4^{20}$  0.9228. Di-tert-amyl peroxide vinyl propyl silane  
 $\text{CH}_2=\text{CH}-\text{Si}(\text{C}_3\text{H}_7)[-\text{OO}-\text{C}(\text{CH}_3)_2\text{C}_2\text{H}_5]_2$ ; 66% yield; b.  $56^\circ\text{C}$  (0.05 mm);  
 $n_D^{20}$  1.4359;  $d_4^{20}$  0.9145. Di-tert-butyl peroxide allyl methyl silane  
 $\text{CH}_2=\text{CH}-\text{CH}_2-\text{Si}(\text{CH}_3)[-\text{OO}-\text{C}(\text{CH}_3)_3]_2$ ; colorless liquid with satisfactory  
thermal stability; noticeable development of gas bubbles starting at  $158^\circ\text{C}$   
and ending at  $191 - 192^\circ\text{C}$ ; 40% yield; b.  $31^\circ\text{C}$  (0.1 mm);  $n_D^{20}$  1.4182;  
 $d_4^{20}$  0.9094. In addition, the attempt was made to obtain analogous peroxides  
with two peroxide groupings in a pure form also with cumene hydroperoxide.  
These peroxides could, however, not be distilled by fractional  
distillation (0.01 mm) on a boiling water bath. Isolation of these  
peroxides by freezing them out of their solutions was also not possible.  
After distilling off the solvent, the peroxides were obtained in the form  
of concentrates with a content of 65 - 70% of pure product. Positive  
results were achieved when testing them in the vulcanization of various  
rubber mixtures. There are 3 references: 2 Soviet and 1 non-Soviet.  
The reference to the English-language publication reads as follows: N. A. X

Card 3/4

Synthesis of unsaturated...

S/020/62/142/006/015/019  
B106/B101

Milas, D. M. Surgenor, J. Am. Chem. Soc., 68, 643 (1946).

ASSOCIATION: L'vovskiy politekhnicheskii institut (L'vov Polytechnic  
Institute)

PRESENTED: September 25, 1961, by B. A. Arbuzov, Academician

SUBMITTED: September 20, 1961

Card 4/4

X

DIKIY, M.A.; YURZHENKO, T. I.

Synthesis of the hydroperoxides of halo derivatives of  
isopropylbenzene and the study of their thermal decomposition  
rate. Dokl. IPI 5, no. 1/2:15-19 '63. (MIRA 17:6)

YURZHENKO, T.I.; ZAN'KO, A.A.; SERDYUKOVA, O.K.; NAMCHUR, L.P.

Polarographic and spectrophotometric study of some organic  
peroxide compounds. Dokl. LPI 5 no. 1/2:41-47 '63.

(MIRA 17:6)

YURZHENKO, T.I.; PUCHIN, V.A.; GOLOKHVASTOVA, V.S.

Oxidation-reduction polymerization of acrylonitrile in the  
presence of organic hydroperoxides. Dokl. LPI 5 no. 1/2:  
48-54 '63. (MIRA 17:6)

DIKIY, M.A.; YURZHENKO, T.I.

Synthesis of hydroperoxides of halo derivatives of isopropylbenzene  
and the rate of its thermal decomposition in  $\alpha$ -methylstyrene. Zhur.  
ob.khim. 33 no.4:1360-1363 Ap '63. (MIRA 16:5)

1. L'vovskiy politekhnicheskii institut.  
(Cumene) (Hydroperoxide)

VILENSKAYA, M.R.; YURZHENKO, T.I.

Synthesis of tertiary alkyl hydroperoxides  $C_6 - C_{11}$ .  
Zhur. ob. khim. 34 no. 3:748-752 Mr '64. (MIRA 17:6)

1. L'vovskiy politekhnicheskii institut.

ACCESSION NR: AP4013335

S/0020/64/154/003/0679/0682

AUTHOR: Litkovets, A. K.; Yurzhenko, T. I.

TITLE: Investigating the rate of thermal decomposition of organosilicon peroxides

SOURCE: AN SSSR. Doklady\*, v. 154, no. 3, 1964, 679-682

TOPIC TAGS: unsaturated organosilicon peroxide, organosilicon monoperoxide, organosilicon diperoxide, organosilicon triperoxide, thermal stability, thermal decomposition, solvent effect, unsaturated alkylsilane peroxide, high temperature polymerization, vulcanization, decomposition rate

ABSTRACT: A systematic study was made of the thermal stability of unsaturated organosilicon peroxides containing 1, 2 or 3 peroxide groups on the Si atom. Decompositions were conducted under a nitrogen atmosphere at 120, 130 and 140C in isopropylbenzene, ethylbenzene, and toluene containing 0.2M active oxygen per liter of solution. The

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ACCESSION NR: AP4013335

following compounds were investigated: tert.-butyl- (I), cumyl- (II) and tert.-amyl- (III) monoperoxides of methylvinylethylsilane; di-tert.-butyl peroxides of methylvinylsilane (IV), vinyl ethylsilane (V), vinylpropylsilane (VI), and methylallylsilane (IX); di-tert.-amyl peroxides of methylvinyl silane (VII) and vinylpropylsilane (VIII); and, the tri-tert.-butyl peroxide of vinyl silane (X). The rate constant increases in solvents with lowered activity, i.e., it is greater in toluene than in ethylbenzene and isopropylbenzene. From Figs. 1 and 2, it is seen that the monoperoxides and the di-peroxide of the allyl silane do not decompose according to the first order equations and the stability of (III) is much lower than that of (I) and (II). It is also seen that the di- and tri-peroxides follow the rule of monomolecular reactions and the triperoxide is least stable. The electronegativity of the Si is increased by the accumulated peroxides groups. The nature of the alkyl substituents is that it affects the stability of Si and the peroxide. It was found that with the tert.-butyl group the effect on the peroxide is that the compounds are more stable than with the tert.-amyl; and the

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ACCESSION NR: AP4013335

effect of the alkyl radicals on the Si is that it increases stability in proportion to their positive inductive effect on the Si propyl more than Si methyl, and more than Si ethyl. This information should be helpful in selecting compounds for use in high-temperature polymerization and vulcanization processes. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: L'vovskiy politekhnicheskii institut (L'vov Polytechnical Institute)

SUBMITTED: 31Jul63

DATE ACQ: 26Feb64

ENCL: 01

SUB CODE: CH

NO REF SOV: 007

OTHER: 014

Card 3/4

YURZHENKO, T.I.; FEDOROVA, V.A.

Synthesis of nesterers of aliphatic dibasic acids. Zhur. org.  
khim. 1 no.4:688-691 Ap '65. (MIRA 18:11)

1. L'vovskiy politekhnicheskii institut.

YUREZENKO, T.I.; APAROVICH, L.M.

Synthesis of propionic acid peroxide esters. Zhur. org. khim.  
1 no.7:1218-1220 J1 '65. (MIRA 18:11)

1. L'vovskiy politekhnicheskij institut.

TOLOPOLO, D.K.; MOKRIVSKIY, T.M. [Mokrivskiy, T.M.]; YUREZHENKO, I.I.; PYRIK, Ya.M. [Pyrik, I.A.M.]

Using the continuous method for the production of acryl chloride.

Khim.prom. [Ukr.] no.2:14-16 Ap-Je '65.

(MIRA 18:6)

00391-66 ENT(m)/EPF(c)/EMP(j)/T RPL NW/EM  
ACCESSION NR: AP5021284

UR/0020/65/163/005/1181/1184

AUTHORS: Yurzenko, T. I.; Vilenskaya, M. R.; Osetskaya, V. A.

TITLE: Synthesis of polymerizable peroxide esters of acrylic and methacrylic acids

SOURCE: AN SSSR. Doklady, v. 163, no. 5, 1965, 1181-1184

TOPIC TAGS: polymerization, acrylic acid, methacrylic acid, peroxide, synthesis

ABSTRACT: The object of the investigation was to synthesize peroxy-ester monomers. The following esters were synthesized: tert-butylpercaprylate, tert-amylpercaprylate, dimethylethynyl-percaprylate, 2,5-bis(acryloylperoxy)-2,5-dimethylhexyne-3, cumylpercaprylate, n-chloro-cumylpercaprylate, n-bromopercaprylate, n-nitrocumylpercaprylate, tert-butylpermethacrylate, cumylpermethacrylate, n-chlorocumylpermethacrylate, n-bromocumylpermethacrylate, n-nitrocumylpermethacrylate. The peroxides were synthesized by the reaction of the corresponding hydroperoxides with the corresponding alcohols. The peroxides were purified by distillation. The peroxides were characterized by their boiling points, refractive indices, and densities. The peroxides were also characterized by their infrared spectra. The peroxides were found to be stable at room temperature. The peroxides were found to be soluble in organic solvents. The peroxides were found to be polymerizable. The peroxides were found to be suitable for use as initiators in the polymerization of acrylic and methacrylic acids.

Card 1/2

L 00391-66  
ACCESSION NR: AP5021284

ASSOCIATION: L'vovskiy politekhnicheskii institut (L'vov Polytechnical Institute)

SUBMITTED: 22Nov64

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 009

Card 2/2

L 36283-66 ENT(m)/ENP(j)/T RM/WN/JWD

ACC NR: AP5027232

(A)

SOURCE CODE: UR/0020/65/164/006/1335/1338

AUTHOR: Yurzhanko, T. I.; Fuchin, V. A.; Voronov, S. A.

ORG: L'vov Polytechnical Institute (L'vovskiy politekhnicheskiy institut) 44  
43  
B

TITLE: Polymerization and copolymerization of some peroxide monomers

SOURCE: AN SSSR. Doklady, v. 164, no. 6, 1965, 1335-1338

TOPIC TAGS: polymerization, copolymerization, monomer, peroxide, resin

ABSTRACT: The polymerization and copolymerization of alkyl peresters (tert-butyl-peracrylate, tert-amylperacrylate, dimethylethynylmethyl peracrylate, p-nitrocumyl-peracrylate, and tert-butylpermethacrylate) with nonperoxide vinyl monomers was studied to extend their use for the preparation of graft and modified polymers. The results of polymerizations at different temperatures and with different concentrations of peresters are given in Table 1. The optimal temperatures of polymerization extended from 0-50C; tert-butylpermethacrylate copolymerized with styrene by exponential law, while the polymer formed was less stable than the monomer. The copolymerization of the remaining peresters proceeded as a zero-order reaction. The copolymerization of tert-butylperacrylate with methyl methacrylate proceeded much faster than with styrene and its rate increased with the concentration of the perester. Analogous reactions of cumyl peracrylates  $H_2C:chc(O)OOC(CH_3)_2$  R (R-H, Cl, or Br) and cumylpermethacrylates

Card 1/3

UDC: 6780015

L 36283-66

ACC NR: AP5027232

Composition of mixture	temp. in °C	concn. of perester (mole%)	rate of polymerization (%/hr)	degree of polymerization %	intrinsic viscosity	molec. weight
St I + I	40	1	0.4	26.7	0.712	168 000
		2	0.5	38.8	0.428	83 000
		5	0.55	42.5	0.201	29 400
		10	0.55	41.0	0.139	17 400
		10	0.55	41.1	0.410	135 000
	60	1	1.0	42.2	0.401	76 300
		2	1.1	43.0	0.214	30 100
		5	1.5	42.0	0.143	18 600
		10	1.25	43.7	0.093	9 900
		25	1.01	45.8	0.406	77 000
St II + II	60	2	3.1	41.1	0.183	25 200
		5	4.1	37.7	0.125	15 200
		10	3.3	40.8	0.539	414 000
		1	1.0	42.0	0.401	77 000
		2	1.2	43.7	0.205	29 800
	60	5	1.6	41.8	0.125	15 000
		10	1.4	40.0	0.1804	24 900
		2	1.99	33.2	0.0393	9300
		5	3.3	39.0	0.0592	5200
		10	4.45	37.1	0.145	18 000
St I + III	60	1	0.75	39.9	0.101	11 000
		2	0.9	43.0	0.055	4 800
		5	0.9	49.0	0.247	39 000
		1	3.0	43.0	0.150	19 000
		2	4.4	46.5	0.0924	9 000
	60	5	5.8	59.2	0.093	9 500
		10	7.4	27.3	0.084	763 800
		1	6.8	23.4	1.250	1 074 000
		2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
St I + IV	40	1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
	60	2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100
St I + V	40	1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
	60	2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100
MM + I	40	1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
	60	2	11.7	37.4	0.602	376 100
		5	19.7	26.7	0.237	131 210
		10	5.3	26.7	0.237	131 210
		1	0.8	27.3	0.084	763 800
		2	11.7	37.4	0.602	376 100

Card 2/3

L 36283-66

ACC NR: AP5027232

$H_2C=C(CH_3)C(O)OOC(CH_3)_2$  R (R=H, Cl, Br, or  $NO_2$ ) proceeded very slowly and gave low-molecular colored polymers. Apparently, this is due to a heterolytic decomposition. The paper was presented by Academician V. A. Kargin in 6 Apr 65. Orig. art. has: 1 fig. and 2 tables.

Table 1. Characteristics of copolymerization of peresters and their polymers

I - tert-butylperacrylate, II - tert-amylperacrylate, III - dimethylethynyl-methylperacrylate, IV - p-nitrocumylperacrylate, V - tert-butylpermethacrylate, St - styrene, MM - methyl methacrylate

SUB CODE: 11/ SUBM DATE: 06Apr65/ ORIG REF: 010/ OTH REF: 009

Card 3/3 AS

ACC. NR: AP7000910

SOURCE CODE: UR/0138/66/000/012/0006/0008

AUTHOR: Yurzhenko, T. I.; Chuyko, L. S.; Kirichek, A. A.; Blokh, G. A.

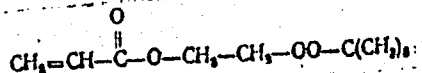
ORG: L'vov Polytechnic Institute (L'vovskiy politekhnicheskiy institut)

TITLE: Synthesis of peroxidated rubbers and nonsulfur vulcanization of these rubbers

SOURCE: Kauchuk i rezina, no. 12, 1966, 6-8

TOPIC TAGS: ~~peroxidated rubber, peroxide monomer, butadiene, styrene, peroxidated rubber vulcanization, peroxidated rubber vulcanizate, nonsulfur vulcanization~~

ABSTRACT: A study has been made of the nonsulfur vulcanization of rubbers involving preliminary introduction of side peroxide groups in the elastomer backbone. The peroxide-group-containing ("peroxidated") rubbers were synthesized by emulsion copolymerization of butadiene, styrene, and tert-butyl 2-acrylateethyl peroxide (AP)



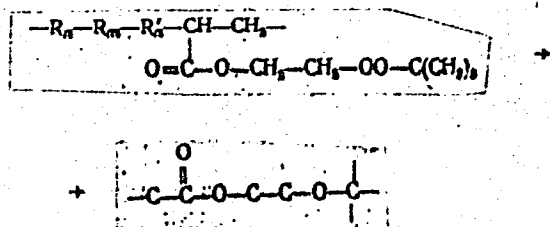
The percentages of the monomers were: butadiene, 67.5—73.0%; styrene, 25%; AP, 2.0—7.5%. The copolymerization procedure is described in the source. The rubber mixtures were prepared at 50C on mills using standard recipes for butadiene-styrene

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UDC: 678.760.2-139.004.12

ACC NR: AP7000910

rubbers. Vulcanizates with the best properties were obtained from peroxidated rubber containing 3.5% AP, and vulcanized at 140C for 30 min (tensile strength, 203 kg/cm<sup>2</sup>; elongation, 543%; residual elongation, 15%). The high vulcanizing effectiveness of peroxide groups, preliminarily introduced in the rubber, is due to their attachment to and regular distribution in the macromolecules:



The proposed nonsulfur vulcanization method makes it possible: 1) to control the distribution and concentration of crosslinks; and 2) to control the length and type of the crosslinks by using different peroxide monomers. Orig. art. has: 1 figure and 2 tables. [BO]

SUB CODE: 11, 07/ SUBM DATE: 09Sep65/ ORIG REF: 004/ ATD PRESS: 5109

Card 2/2

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 ✓ Action of non-saturated alcohols on the speed of polymerization of styrene emulsions and on the dispersion of styrene latexes. S. I. S. Yurshenko and A. I. Yurshenko. Nova. Zapiski. Khim. Sovetsk. Univ. im. I. Frumkina, Ser. Khim. No. 4, 18-24 (1955) (in Russian). — The rate of styrene polymerization was followed by the vol. change. Na dibutyl-1-naphthalenesulfonate and  $K_2S_2O_8$  were used as emulsifier and initiator, resp. The presence of MeOH, EtOH, BuOH, and AmOH slowed down the reaction. For the same mol. concn. the effect increased with mol. wt. of alc. This was attributed to soln. of the monomer in the micelles. The ultimate and  $\eta_{inh}$  also dropped. At pH 1.07 all velocities were less than at pH 1.0 owing to a difference in mode of decaying of  $S_2O_8^{2-}$ . In basic soln., the polymer is more finely dispersed, this correlates with greater concn. of free radicals in soln. and more rapid reaction. EtOH and MeOH increase particle size, but BuOH and AmOH stabilize the emulsion and do not lead to larger particles. In the presence of alcs., the rate of initiation (velocity/total wt. of monomer) at constant  $\eta_{inh}$  is less and the activation energy more. This points to action by the alcs. on the free-radical formation. John Hume Scott

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